CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 93-072
UPDATED WASTE DISCHARGE REQUIREMENTS

POTRERO HILLS LANDFILL, INC.,
FAIRFIELD, SOLANO COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, (hereinafter called the Board), finds that:

PURPOSE OF UPDATE ORDER

1. In September 2, 1992, Potrero Hills Sanitary Landfill (PHLF) submitted proposed revisions to the detection monitoring program for PHLF in accordance with the requirements of the California Code of Regulations (CCR), Title 23, Chapter 15, Article 5 and the provisions of Title 40 Part 258 of the Code of Fedral Regulations (Subtitle D).

   This Order primarily updates, the groundwater monitoring program and liner requirements for the PHLF operation consistent with the requirements of Article 5, Title 23, Division 3, Chapter 15 of the California Code of Regulations and the provisions of Title 40 Part 258 of the Code of Federal Regulations (Subtitle D).

2. Potrero Hills Landfill, Inc., the site legal owner and the landfill operator, (hereinafter referred to as the discharger) operates a Class III landfill on 320 acres southeast of the City of Fairfield in Solano County. The project site as shown on Attachment A, which is incorporated herein and made a part of this Order, is located South of Travis Air Force Base and approximately one mile south of State Highway 12 at the southern end of Emmington Road.

3. The landfill has received waste since August, 1986 and is currently permitted to occupy 190 acres of the 320 acre site. The landfill has an estimated lifetime of approximately 30 to 57 years and waste capacity of 16.4 million cubic yards as of March 1992. This landfill will continue to serve the longtime disposal needs of Fairfield, Suisun City and Green Valley unincorporated areas of Solano County. The landfill also serves other areas as a regional solid waste disposal facility.

4. The Board on October 16, 1985, adopted Order No. 85-121

prescribing Waste Discharge Requirements for the disposal of Class III waste in Potrero Hills landfill. This Order updates Order No. 85-121 in accordance with the CCR, Title 23, Chapter 15, Article 5 and the provisions of Title 40 Part 258 of the Code of Federal Regulations (Subtitle D).

5. Sections 2533(b), (c), (d) and (e) of Chapter 15 states that new Class III and existing Class II-2 shall be sited where soil characteristics, distance from groundwater, and other factors will ensure no impairment of beneficial uses of surface water or of groundwater beneath or adjacent to the landfill. These factors have been evaluated as indicated below:

   a. size of the waste management unit.

   b. permeability and transmissivity of underlying soils.

   c. depth to groundwater and variations in depth to groundwater.

   d. background quality of groundwater.

   e. current and anticipated use of groundwater.

   f. annual precipitation.

   g. potential for ground rupture.

   h. potential for rapid geologic change.

WASTES AND THEIR CLASSIFICATION

6. The discharger proposes to continue to discharge the following wastes to the landfill:

   a. Municipal solid Waste - classified as " nonhazardous Solid Wastes or inert Wastes" using the criteria set forth in Chapter 15.

   b. Nonhazardous automobile shredder Waste - acceptable upon Board's approval.

   c. Asbestos - consistent with Title 22 of the Health and Safety Code (Section 25143.7).

   d. Sewage Sludge pursuant to Section 2523(c) of Chapter 15. Provision 10 of this order requires the discharger to submit a Sludge Management Plan prior to accepting Sludge

for disposal at the landfill.

e. Ash - acceptable upon Board's approval.

f. Agricultural waste, dead animals, construction and demolition debris, liquids (includes septage) and Industrial waste.

7. Leachate from the landfill's leachate collection and recovery system will be disposed of on-site by discharging leachate over dormant portions of the intermediate covered landfill areas during the summer to evaporate the water.

Effective October 1, 1993, recirculation of leachate and gas condensate will be limited to areas of the landfill equipped with liner systems and a leachate collection and recovery system that meet Subtitle D and Chapter 15 requirements.

SITE DESCRIPTION

8. The landfill is located in the central valley of the Potrero Hills. This valley was formed by a large geologic fold structure referred to as the Potrero Hills Anticline. The core of this anticline is underlain by approximately 700 feet of low permeability siltstone and claystone of the Capay shale and an unnamed shale. The majority of the landfill is underlain by these claystone/shale sediments that have inplace permeabilities of $1x10^{-6}$cm/sec to $1x10^{-7}$cm/sec. The remaining area, mostly in the northern portion of the landfill, is underlain by the Nortonville shale member of the Kreyenhagen Formation and Domengine sandstone that have permeabilities of $1x10^{-4}$ to $1x10^{-5}$cm/sec.

GEOLOGY

9. The surface and subsurface geology of the site has been evaluated based on field mapping, literature review, geophysical surveys (seismic refraction and vertical electrical sounding) and review of geologic logs from well borings.

10. STRATIGRAPHY - The landfill area is underlain by bedrock - Capay and unnamed formation, alluvium deposits and residual soils. The primary geologic units at the site are as follows:

Capay shale - The landfill is underlain by approximately 700 feet of low permeability siltstone and claystone of the Capay shale and an unnamed shale.

Domengine sandstone - The northern portion of the landfill is underlain by the Domengine sandstone which exhibits moderate permeability on the order of $1x10^{-4}$ to $1x10^{-5}$ cm./sec.

Other soils - The topsoil consist of alluvial and fanglomerate deposits. These deposits consist of sandy clay to clayey gravel having a maximum thickness of 15 feet along the southern flank of the valley, south of the landfill.

11. STRUCTURE - The main geologic structure is the Potrero Hills Anticline, this is a large geologic fold structure located along the western boundary of the Sacramento Valley within the northern Coast Ranges Province. The nearest active fault to the site is the Green Valley Fault, located 10 miles West of the site. The Hayward-Rodgers Creek Fault and the San Andreas Faults are located approximately 26 and 43 miles west of the site respectively. Additionally, an unnamed Fault crosses the center of the site. The investigation of this fault (Cooper-Clark and Associates, 1972 ; EMCON Associates, 1983 and 1985) conclude that the excavations show no evidence that the fault is active. This is not a known Holocene fault. Post depositional deformation of the bedrock has resulted in folding, fracturing, shearing and the formation of sandstone injection dikes into claystone and siltstone strata.

SURFACE WATER AND GROUNDWATER

12. SURFACE WATER - Seasonal runoff from the upstream valley is collected in a stock pond east of the facility for conveyance around the waste management unit in a perimeter channel and discharged to a natural swale west of the site.Surface water runoff from the landfill flows to the west and the northwest and eventually flows into the Hill Slough. Hill Slough is contiguous with Grizzly Bay and Suisun Bay. The Slough surrounding the Potrero Hills are subject to tidal influence and are considered part of the greater Suisun Marsh system of waterways. Various permanent and temporary facilities are used to divert and control on-site surface water. In active fill areas, temporary berms and ditches direct runoff away from the working face. Runoff from the Waste Management Unit is stored in sedimentation basins before release into the natural waterways.

13. GROUNDWATER - Groundwater occurs in the two main geological formations of the landfill, the Domengine Sandstone formation and the Capay and the unnamed formations. These two hydrostratigraphic units are not interconnected and also differ in their hydraulic properties. The groundwater level in the Domengine sandstone formation is approximately 40 feet

beneath the ground surface. When surface runoff infiltrates into the Domengine sandstone the water will migrate down vertically along the dip of the anticlinal formation. The area of the landfill underlain by the Domengine sandstone exhibits a moderate permeability of $1x10^{-4}$ to $1x10^{-5}$cm/sec. Groundwater is also found in perched aquifer in the shallow alluvium flanking the northerly external slope of the Potrero Hills.

14. GROUNDWATER DEGRADATION - Areas at risk for potential groundwater degradation are the fracture zones within the weathered Capay shale and the Domengine sandstone, beneath the landfill.

15. BACKGROUND WATER QUALITY - Ground and surface water from most of the sampling locations in Potrero Hills landfill has an average pH of 7 and total dissolved solids that ranges between 3,000 to 30,000 parts per million. The groundwater found in Capay and unnamed formations is limited to fracture porosity in the cracks of weathered zones. These cracks continue down into the unweathered zone but they become smaller with depth, thereby holding lesser amount of water. This shallow groundwater is of generally good quality for most beneficial uses; however, the high sulfate and dissolved solids concentrations, together with the difficulty in obtaining useable quantities, makes the groundwater unacceptable as a drinking water supply as documented in 1983 EMCON Associates report of site investigation.

16. BENEFICIAL USES - Beneficial uses of the useable groundwater found in the surficial and alluvial deposits surrounding the Potrero Hills valley and of Hill Slough and Suisun Bay are:

    a. Domestic water supply.

    b. Agricultural supply.

    c. Water contact recreation.

    d. Non-contact water recreation.

    e. Warm fresh water habitat.

    f. Wildlife habitat.

    g. Estuarine habitat.

    h. Preservation of rare and endangered species.

    i. Fish migration and spawning.

The discharger submitted the following reports which propose to construct and operate the landfill in accordance with the requirements of Chapter 15 and are hereby approved and incorporated into this order.

i. Proposed Monitoring Program Potrero Hills Sanitary Landfill Solano County, California. (EMCON August 1992)

ii. Report of Disposal Site Information For the Potrero Hills Landfill August 1992, revised April 1993.

iii 1992 Leachate Monitoring System Evaluation report, February 1993.

SLOPE STABILITY (Refer to Table 1, Slope Stability Analyses Summary)

17. As part of the geotechnical evaluation and design for the landfill, the discharger evaluated the static and seismic stability of the permanently exposed cut slopes, the toe berm and the final landfill slopes. A summary of the slope stability evaluation is shown on Table 1.

18. STATIC SLOPE STABILITY - The static stability of the permanently exposed cut slopes, the toe berm and the final landfill slopes was analyzed using SLOPE-II, a computer program commercially available through Boeing Computer Services (BCS, 1981). The program is based on the theory of limit equilibrium of forces and moments acting within the slope in question to determine the factor of safety. All stability results shown on Table 1 were computed using the simplified Bishop Method of analysis (Bishop 1955). The result indicates that the final slope has a minimum factor of Safety approximately 70% higher (2.6 vs 1.5) than required for long term stability of dams and that the exterior slopes of the PHLF is adequately stable. The strengh parameters and soil properties used are friction angle, cohesion and total unit weight. Board staff has reviewed the strength parameters and soil properties used by the discharger in the stability analysis and finds that they appear reasonable. Thus the Board finds that the static slope stability analysis is acceptable.

19. PSEUDO-STATIC STABILITY - Pseudo-static stability were performed to determine the yield acceleration for the slope as a function of the assumed value of shear strengh. The yield acceleration is defined as that pseudo-static coefficient corresponding to a factor of Safety equal to 1.0. The results of the yield acceleration values for PHLF vary between 0.3g and 0.38g, depending on the assumed shear strength. Yield

acceleration values in excess of 0.25g are uncommon, the high yield acceleration values for PHLF was probably due to the flatness of slope (4.1) and low unit weight of the refuse materials. The yield acceleration values were evaluated in a simplified dynamic analysis to estimate the displacement that could occur during a maximum probable earthquake.

20. DYNAMIC STABILITY - Ground Response and Deformation Analysis: Chapter 15 requires that "Class III waste management units be designed to withstand the maximum probable earthquake without damage to the foundation or to the structures that control leachate, erosion or gas". EMCON estimated maximum probable bedrock acceleration to be expected at the site due to earthquakes emanating from any of the nearby faults (i.e Green Valley, Haywards-Rogers Creek, San Andreas and Vacaville-Winters faults). The results presented in Table 1 indicates that the maximum probable bedrock acceleration expected to occur at the PHLF from each seismic source are lower than the maximum probable earthquake magnitude. Thus based on the seismic stability analysis and the requirements for a detailed Post Earthquake Inspection Plan, the Board finds that the seismic slope stability analysis is acceptable.

DESIGN OF WASTE MANAGEMENT UNIT

21. The Potrero Hills landfill is underlain by the Capay shale formation which are fractured in some areas and the Domengine sandstone. The entire landfill area shall be provided with a liner system and a leachate collection and removal sytem that meets Subtitle D and Chapter 15 requirements with the exception of Cells 1, 2, 3, 4, 5A, 5B, 6N, 6S, 7, 7E, 8 and 9 of Module 1 which were constructed to meet the requirements of Waste Discharge Requirement Order No. 85-121. The northern portion of the landfill underlain by the Domengine sandstone and other areas underlain by alluvium deposits must have an underdrain system where spring water need to be drained.

22. The site design maintains the existing pattern of westward drainage in the valley. The landfill surface is sloped to drain nominally from north to south. Areas of disturbed soil are sloped to drain into siltation control basins. The composting, wood waste shredding and concrete debris processing areas are sloped to drain into siltation control basins.

23. The landfill is being constructed with a landfill gas collection and recovery system. In the future electricity production from the extracted gas is planned.

24. The Regional Board adopted a revised Water Quality Plan for the San Francisco Bay Basin in September, 16, 1992 and this Order implements the water quality objectives stated in that plan.

MONITORING PROGRAM

25. The discharger proposes Water Quality Protection Standard pursuant to Article 5, Section 2550.2. The proposed WQPS consists of five elements: (1) Monitoring points (2) Constituents of concern (3) Concentration limits (4) Points of Compliance and (5) Compliance period.

    a. This Order requires the discharger to install monitoring wells at appropriate locations approved by the Executive Officer along the downgradient landfill boundary limits at the point of Compliance. Wells GW2 and GW1 shall be properly destroyed. The upgradient proposed monitoring wells are considered appropriate.

    b. Surface water shall be monitored at three monitoring points. One at the southern margins and the western margins of the WMU at sedimentation basins 1 and 2 and an upstream background sampling point.

    c. The unsaturated zone shall be monitored in the northern parts of the landfill that will have refuse underlain by the Domengine Sandstone. The Unsaturated zone monitoring program shall be conducted to satisfy the requirements of Article 5, Section 2550.7.

    d. The discharger shall analyze for the constituents of concern COCs and monitoring parameters as presented in Table A of the Discharge Monitoring Program for the PHLF.

CALIFORNIA ENVIRONMENTAL QUALITY ACT.

26. The Solano County Department of Environmental Management, as lead agency, certified a final Environmental Impact Report in March of 1984, in accordance with California Environmental Quality Act (Public Resources Code Section 21000 et. seq.) It is intended that the findings, prohibitions, specifications and provisions of this Order be consistent with the certified final Environmental Impact Report.

27. The final Environmental Impact Report found that the proposed